IN THE CLAIMS

1. (Original) A feed forward amplifier, comprising:

an input for receiving an RF signal;

a main amplifier receiving and amplifying said RF signal;

a gain adjuster coupled between the RF input and the main amplifier;

a main amplifier output sampling coupler;

a first delay coupled to the input and providing a delayed RF signal;

a carrier cancellation combiner coupling the delayed RF signal to the sampled output from the main amplifier;

a test coupler for sampling the output of the carrier cancellation combiner;

an error amplifier receiving and amplifying the output of the carrier cancellation combiner;

a second delay coupled to the output of the main amplifier;

an error coupler combining the output from the error amplifier and the delayed main amplifier output from the second delay so as to cancel distortion introduced by the main amplifier;

an output coupled to the error coupler output and providing an amplified RF signal; and

an adaptive controller, coupled to the test coupler, for controlling the gain adjuster setting to provide a gain adjustment which is offset from a gain adjustment which maximizes carrier cancellation at the carrier cancellation combiner, which offset is adjustable by changing the floor of a gain adjustment cost function.

2. (Original) A feed forward amplifier as set out in claim 1, further comprising an input reference coupler for sampling the RF signal provided to the input and wherein the adaptive controller is coupled to the input reference coupler and derives a first loop gain value from the signals from the test coupler and input reference coupler.

3. (Original) A feed forward amplifier as set out in claim 2, further comprising a first signal power detector and a first analog to digital converter coupled between the input

reference coupler and the controller and a second signal power detector and a second analog to digital converter coupled between the test coupler and the controller.

4. (Original) A feed forward amplifier as set out in claim 1, further comprising a phase adjuster coupled between the input and the main amplifier.

5. (Original) A feed forward amplifier as set out in claim 4, wherein the controller controls the phase adjuster to provide a phase adjustment which maximizes carrier cancellation at the carrier cancellation combiner.

6. (Original) A feed forward amplifier as set out in claim 1, wherein said adaptive controller comprises a processor implementing a cost minimization search algorithm.

7. (Original) A feed forward amplifier as set out in claim 6, wherein said cost minimization search algorithm includes a penalty based on the direction of gain adjustment.

8. (Original) A feed forward amplifier as set out in claim 1, further comprising a source of a pilot signal which is injected into the signal path before said main amplifier and a pilot signal detector coupled to the output and wherein the controller receives the detected pilot signal.

9. (Original) A feed forward amplifier as set out in claim 8, further comprising a second gain adjuster and a second phase adjuster coupled between the carrier cancellation combiner and the error amplifier and wherein the controller adjusts the setting of the second gain adjuster and second phase adjuster based on the detected pilot signal.

10. (Original) A feed forward amplifier, comprising:

an input for receiving an RF input signal;

a first control loop coupled to the input and comprising a main amplifier, a sampling coupler, a delay, and a cancellation combiner, the first control loop having a gain;

a second control loop coupled to the first control loop and comprising a delay, an error amplifier, and an error coupler;

an output coupled to the error coupler;

means for detecting the first control loop gain; and

means, coupled to the means for detecting, for controlling the first control loop gain to stabilize said control loop gain at a value offset from a minimum of a loop gain control function.

11. (Original) A feed forward amplifier as set out in claim 10, wherein said means for controlling comprises a gain adjuster in said first control loop between the input and main amplifier and a processor implementing a loop control algorithm and providing variable adjuster settings to said gain adjuster.

12. (Original) A feed forward amplifier as set out in claim 11, wherein said means for detecting comprises an input reference coupler coupled to the input and a test coupler coupled to the output of the carrier cancellation combiner.

13. (Original) A feed forward amplifier as set out in claim 12, wherein said means for detecting further comprises a first signal power detector coupled to said input reference coupler and a second signal power detector coupled to said test coupler.

14. (Original) A feed forward amplifier as set out in claim 13, wherein said means for detecting further comprises a first analog to digital converter coupled to said first signal power detector and outputting a first digital power signal to said processor and a second digital to analog converter coupled to said second signal power detector and outputting a second digital power signal to said processor.

15. (Original) A feed forward amplifier as set out in claim 14, wherein said processor determines said first control loop gain from the first and second digital power signals.

16. (Currently Amended) A feed forward amplifier as set out in claim ~~10~~11, wherein said processor and algorithm calculate a cost function associated with the adjuster settings which is derived from the detected first control loop gain and a preset floor value of the cost function.

17. (Original) A feed forward amplifier as set out in claim 16, wherein said processor and algorithm vary said adjuster settings employing said cost function to move the calculated cost function toward the preset floor value.

18. (Original) A feed forward amplifier as set out in claim 17, wherein said processor and algorithm further add a penalty to the cost function if the cost function is at the floor value and the adjuster setting is moving in an undesired direction.

19. (Original) A feed forward amplifier as set out in claim 18, wherein the undesired direction corresponds to increasing gain adjuster settings.

20. (Original) A feed forward amplifier as set out in claim 18, wherein the undesired direction corresponds to decreasing gain adjuster settings.

21. (Original) A method for amplifying an RF input signal employing feed forward compensation, comprising:

receiving an RF input signal;

amplifying said RF input signal employing a main amplifier;

sampling the main amplifier output;

delaying the RF input signal and providing a delayed RF input signal;

coupling the delayed RF input signal to the sampled output from the main amplifier so as to cancel at least a portion of a carrier component of said sampled

output from the main amplifier and provide a carrier canceled signal having a carrier component and a distortion component;

amplifying the carrier canceled signal employing an error amplifier to provide an error signal;

delaying the output of the main amplifier;

combining the error signal and the delayed output of the main amplifier so as to cancel distortion introduced by the main amplifier and providing an amplified RF output;

adjusting the gain of the signal input to said main amplifier by a variable gain setting; and

controlling said adjusting of the gain of the signal to a steady state setting offset from a setting which minimizes the carrier component of said carrier canceled signal by employing a gain control cost function having a floor and a penalty associated with the direction of said adjusting.

22. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 21, wherein said penalty is associated with increasing the gain of the signal and said steady state setting is offset below a setting which minimizes the carrier component of said carrier canceled signal.

23. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 21, wherein said penalty is associated with decreasing the gain of the signal and said steady state setting is offset above a setting which minimizes the carrier component of said carrier canceled signal.

24. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 21, wherein the floor of said cost function defines a plurality of gain settings having equal cost.

25. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 24, wherein said steady state setting comprises one of said plurality of gain settings having equal cost.

26. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 25, wherein said steady state setting comprises the lowest gain setting having equal cost.

27. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 25, wherein said steady state setting comprises the highest gain setting having equal cost.

28. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 21, wherein said gain control cost function has a lower boundary defined by said floor, said lower boundary having first and second edges.

29. (Original) A method for amplifying an RF input signal employing feed forward compensation as set out in claim 28, wherein said steady state setting corresponds to one of said first and second edges of said lower boundary of the cost function.

Claims 30-33 (Cancelled)